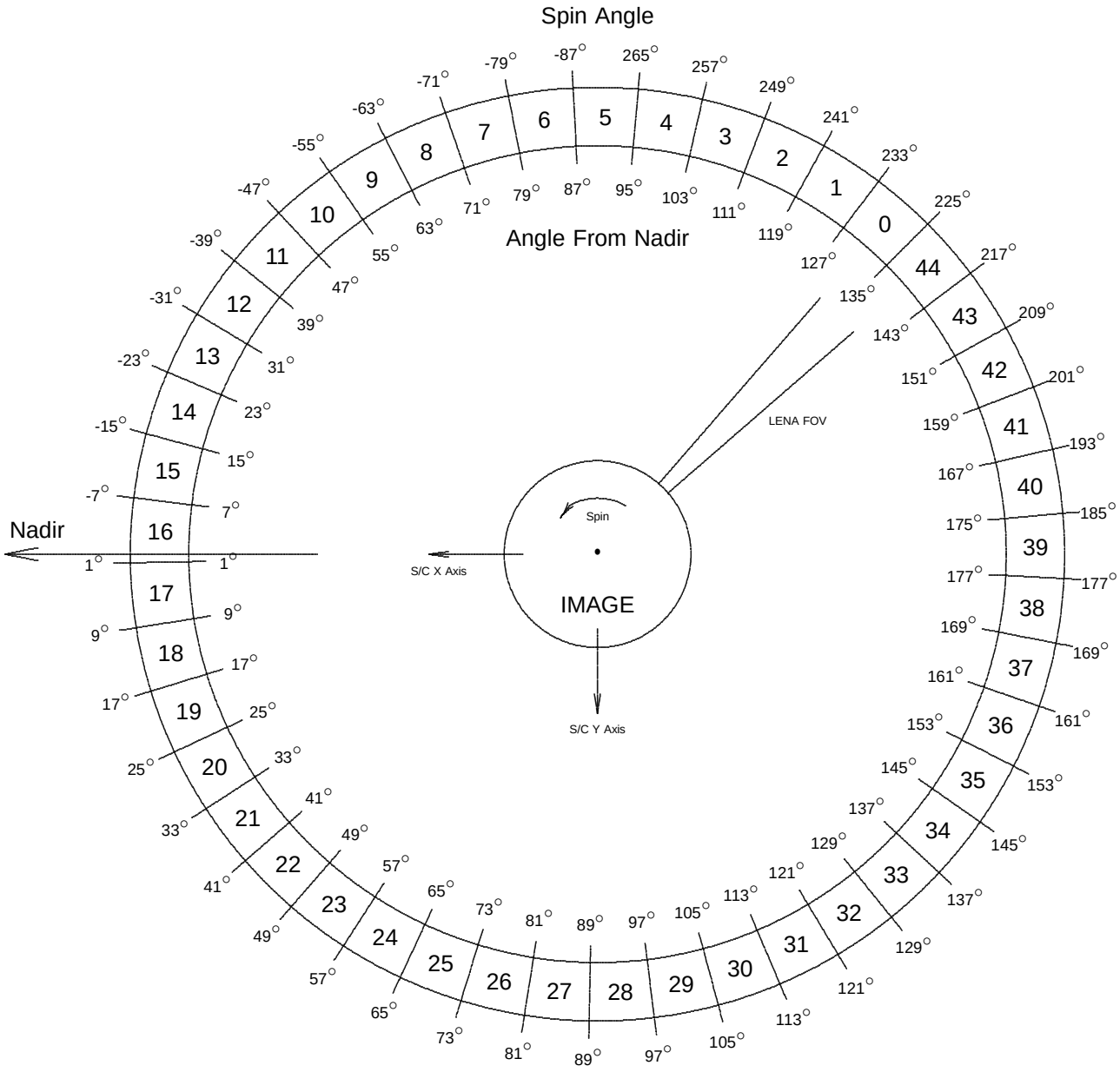
LENA Spin Diagram



The LENA Spin Diagram

David G. Simpson
NASA Goddard Space Flight Center
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This figure shows the relationships between the LENA spin angle, azimuthal sector numbers, and spacecraft orientation.

At the center of the figure is a circle representing the IMAGE spacecraft, as seen from above, looking down onto the spacecraft's +Z axis. The spacecraft X and Y axes are also shown, as is the eight-degree LENA field of view (labeled "LENA FOV"). This IMAGE circle spins counterclockwise as the spacecraft spins, with a period of approximately two minutes.

Shown along the outside of the figure is an imaginary ring surrounding the IMAGE spacecraft, lying in the spacecraft XY-plane (which is also the spacecraft orbit plane). This ring keeps the arrow labeled "Nadir" fixed toward the center of the Earth, so that the ring rotates (clockwise) once per orbit. The large numbers inside the boxes of the ring show the azimuthal sector numbers (0 through 44). The corresponding spin angles are shown along the outside edge of the ring. The angles along the inside of the ring show the angle from nadir (Earth center).

Since the IMAGE spacecraft is spinning about its +Z axis, the inner IMAGE circle rotates within the outer ring with a period of about two minutes. This figure shows the spacecraft position at one instant in time -- when the spacecraft X-axis is pointed toward nadir. (This happens once per spin.) At this instant, the LENA field of view is centered at the start of azimuthal sector 0 (i.e., at the boundary between sectors 44 and 0).

The center of the Earth (nadir) is located at spin angle 0° and azimuthal sector 16.875 (where sector 16.000 is at the boundary between sectors 15 and 16). The relation between spin angle and azimuthal sector number is given by

$$S = 8° \, (A - 16.875) \, ,$$

where S is the spin angle (in degrees), and A is the azimuthal sector number. By convention, the spin angle S is reduced to the range [-90°, 270°).